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ABSTRACT

A literature review traced a major theoretical shift in the understanding of how people read--from the passive reader who receives and decodes information to the strategic reader who actively chooses what, when, and how to read, reads interpretively, and interprets a text (such as a newspaper article) as an organized structure. The result is a series of 26 recommendations on how to write for such readers, including: signal the organization of the text; signal the learning purpose of the text; clearly identify the audience; model and encourage thinking; anticipate misunderstandings; make the information meaningful; and promote synthesis, meaning, values, and culture. These concepts can be used to improve journalistic practice, professional education, and the teaching of writing in general. (Contains 51 notes, a table listing the 26 recommendations, and 3 figures.) (Author/RS)

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# Serving the Strategic Reader

## Cognitive Reading Theory and its Implications for the Teaching of Writing

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ED 406 644

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## Abstract

This study traces a major theoretical shift in our understanding of how people read--from the **passive reader** who receives and decodes information to the **strategic reader** who actively chooses what, when, and how to read, reads interpretively, and interprets the article as an organized structure.

The result is a series of recommendations on how to write for such readers. An extensive annotated bibliography is included.

Though originally directed to the teaching of journalism, this article has been enlarged to extend its conclusions to the teaching of writing in general.

**Authenticity:** This is a working paper, based on a pilot study. It contains a literature review, careful observations of a limited number of cases, and a considerable amount of informed speculation.

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# Serving the Strategic Reader

## Cognitive Theory and Journalistic Practice

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Opening Quotes:

> "To completely analyze what we do when we read... would be to describe very many of the most intricate workings of the human mind, as well as to unravel the tangled story of the most remarkable specific performance that civilization has learned in all its history." -- E. B. Huey, 1908.
>
> "She was also quite illiterate: She couldn't read the signs and tracks at all."-- the Bushman Xiko, about Dr. Ann Taylor, the New York Doctor of Law stranded in the Kalahari Desert. From the film, *The Gods Must be Crazy II*.

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## Introduction

The past twenty years have brought a revolution in the way we understand reading, yet that revolution has only just begun to have effects on journalistic practice. In the old view,

> Reading is widely preceived to be simply a matter of 'decoding to sound', of translating the basic elements of written language, the letters, into their equivalent sounds in spoken language. Meaning is then assumed to be instantly available in these sounds of speech that the reader imagines hearing, just as the meaning would be apparent if the reader were actually listening to someone else reading aloud. Note 1

The old model of reading is kin to the widely used "information transmission" model of communication, in which senders code messages, transmit them through a medium to readers, who decode them and extract information. Note 2

In the new view, the passive reader of stimulus-response theory and the "decoding" reader of information theory are being replaced by a reader who actively constructs meaning. Rather than responding to stimuli or decoding information, the "new readers" search out material to use in making and confirming the meanings that give order to their lives. Far from being conditioned by their environments or mainly "receiving" information from it, readers make a model of the world and live in that model. Much of their reading is devoted to servicing a viable world-model--a structure which must be maintained much like a house. Note 3

This new model with its "strategic reader" has roots in work that was being done a half century ago: symbolic interactionism, Piaget's theory of equilibrium, Vygotsky's brilliant work on thought and language, Bartlett's formulation of schema theory, the symbol-making philosophy of Susanne Langer and Ernst Cassirer, and others. None of these schools of thought completely disappeared, but all were eclipsed in the interim by the behaviorist stimulus-response model and later by the computer-based

information-processing model. But beginning with the ascent of cognitive psychology in the 1960s, a large new body of research has directed attention to the role of interpretation in perception, knowing, learning, and communicating. This shift--which places the interpreter at the center of a socially-constructed reality--has important implications for journalism and for anyone who is teaching writing. Notes 4 - 10

This paper reviews the theory of the strategic reader, extracts a series of principles from it, and suggests how those may be applied in journalism and in the writing classroom.

# A Cognitive Model of Learning

Figure 1, made by the author from Sharon Derry's review of cognitive learning theory, provides a starting place. Notes 11 - 12

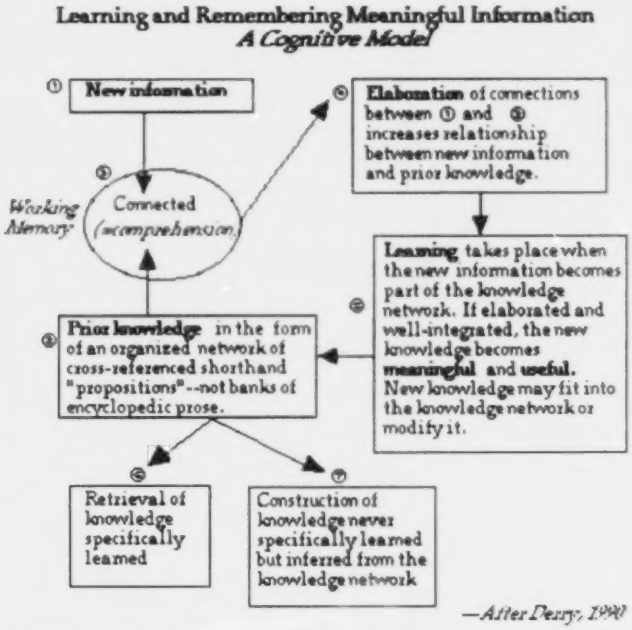
Learning and Remembering Meaningful Information
A Cognitive Model
① New information
⑤ Elaboration of connections between ① and ④ increases relationship between new information and prior knowledge.
③ Working Memory Connected (comprehension)
④ Learning takes place when the new information becomes part of the knowledge network. If elaborated and well-integrated, the new knowledge becomes meaningful and useful. New knowledge may fit into the knowledge network or modify it.
② Prior knowledge in the form of an organized network of cross-referenced shorthand "propositions"--not banks of encyclopedic prose.
⑥ Retrieval of knowledge specifically learned
⑦ Construction of knowledge never specifically learned but inferred from the knowledge network
—After Derry, 1990

Figure 1. A Cognitive Model of Learning

[To continue the **Short Tour**, click here for a summary of this section.]

Steps in Figure 1 are discussed in the following section.

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## Steps 1-3. Comprehension

When faced with a new text, readers do not begin by "reading" in the sense of starting at the first word and moving sequentially toward the last word, they first predict what the passage will mean. Prediction, which plays a key role in Frank Smith's cogent account of reading, can be understood as "the prior elimination of unlikely alternatives" or "questions we ask the world." Note 13 Readers not only predict what an article will contain or what a statement will mean, they predict:

- what prior knowledge will be relevant and
- which strategies will be useful in approaching the new text.

Such predictions may be simultaneous with the first decoding of the letters on the page, and, since a reader can be led to know what to expect by illustrations, the nature of the publication, or other contextual cues, such predictions may even precede reading. Most of this activity is unconscious and appears to be part of the way we orient ourselves in the world.

For example, a glance at the heading "Sports" in a section of the newspaper will cue one reader to relax, settle in for a leisurely perusal of sports news, and begin remembering what she already knows (The playoffs were held last night.), perhaps generating questions (Who won the basketball playoffs?) or otherwise focusing attention, knowledge, and reading strategies (what to skip, which teams to read about) onto the new information (researchers call this activating relevant schemas).

Another reader may see the heading "Sports" and take it as a cue to skip that entire section of the paper. Like all readers, these two are active and strategic: They actively interpret what they read; they choose what to read and how deeply to read it.

Researchers use the word "comprehension" to label what takes place when the reader connects the new information with prior knowledge. Information alone, no matter how well written, does not create comprehension. Comprehension depends on the reader's prior knowledge and reading strategies.

The sports fan has a large body of organized information about sports and can quickly fit new information into this framework. Another reader, with a different body of organized knowledge, may actively seek out a music review to find out how well a visiting chamber group played the opening fugue of Beethoven's C-Sharp Minor Quartet. Much information in the sports pages is incomprehensible to someone lacking prerequisite knowledge of sports; much information in a music review is incomprehensible to someone lacking prerequisite knowledge of music.

Even though both the sports report and the music review contain well-written "information," that information becomes comprehensible only to readers who can combine the new information with organized existing knowledge (a knowledge network) on the subject matter. The comprehension of new information requires a meeting of the new with the known. This meeting of the known with the new is one of the fundamental concepts of cognitive learning theory.

Notice that the known does not wait passively in the mind; it actively goes forth to meet and make sense of the new. Indeed, unless a reader is able to predict, to ask relevant questions, and to know how to find the answers, comprehension is not possible. Note 14

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## Steps 4 and 5. Learning

Comprehension does not necessarily lead to learning--at least, not to learning of a meaningful, useful kind. How many people can remember the actual words of books they read five years ago? As Bartlett demonstrated in the 1930s, people do not ordinarily remember much of the exact information they read. Instead, they learn the "gist" of it. They select. They use selected portions of the information to address issues important to them. (Never mind the national scores, did the local team win?) For all practical purposes, the vast bulk of information one reads is simply forgotten. We use it to "service" our model of the world, then discard the details.

Once new information has been comprehended--by linking it to what is already known--cognitive

theorists say that the new information can then be learned through activities which enrich the connections between the new and the old knowledge. Researchers have studied some ways students convert "comprehended information" into "learned information," through such activities as taking notes, summarizing, outlining, making analogies, relating the information to yourself personally, creating mental imagery, and similar activities known as elaboration.

- **Elaboration** refers to any method of "thinking about new ideas and prior knowledge together" so the two become more deeply connected. Note 15
- **Learning** takes place when the new information becomes a part of the existing knowledge network.
- When elaborated and richly integrated, the new knowledge becomes **meaningful and useful**.
- The new knowledge can **fit into** the existing knowledge network (the number one team won again), or it can **modify** that network (the Dodgers moved to L.A.)

Knowledge can be called "meaningful" only after it is richly interconnected with related knowledge. Knowledge can be called "useful" only if you can access it under appropriate circumstances. Meaningful knowledge is filed and cross referenced with other knowledge to which it is connected. Useful knowledge is filed and cross-referenced so that you can find it when you need it.

Some of these points may seem obvious, but studies strongly suggest that this kind of mental housekeeping makes the difference between good and poor readers. Note 16

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## Steps 6 and 7. Recall and Reconstruction

People apparently do not store knowledge as long, complete strings of text but rather in a dynamic, interlinked network in which the elements have been analyzed into categories linked by multiple relationships that may be organized as schemas, scripts, narratives, or other forms.

The organization of memory seems to be a good deal more like multidimensional hypertext than like paragraphs of linear prose. People not only abstract the gist from what they read, they often do not **recall** what they read verbatim; instead, they **reconstruct** what they "know."

Just as a well-organized knowledge network enables you to scan for and read only what you do not already know in a new text, the knowledge network enables you to regenerate the essence of what you know, rather than having to remember it as complete texts of information. Memory--again, the discovery dates to Bartlett in the 1930s--is reconstructive. People reinvent as they recall, and they appear to reinvent on the basis of some deep structure they have used to hang a few key facts on. A good knowledge structure, in fact, can enable you to "remember" things you never learned--by inferring them from what you already know.

The blurred boundary between inference and perception is one thing that makes eye-witnesses unreliable, and a skillful questioner can induce a witness to "remember" things never experienced. In spite this blurriness, we derive a good deal of our knowledge of the world by applying reason to the things we

already know, extending those by inference, and making good guesses about what "must" exist in the gaps of our knowledge. In Kenneth Boulding's more organic terms, "Knowledge grows also because of inward teachers as well as outward messages." Notes 17 - 18

The basic theme we are developing can be stated this way:

- The world is not given: we interpret, construct, even imagine it.
- We use knowledge to recall some things verbatim, reconstruct the gist of other things, and infer other things we never literally learned.
- In addition, we use knowledge to guide our perceptions, strategies, and comprehension of new experiences and information.
- People seek information in order to create mental constructs, to confirm those mental constructs, and to modify those constructs so that they fit more closely with experience.

In a nutshell: **Cognition is an active, recursive, integrated process by which we continuously model the world and continuously modify the model.**
[If you are on the **Short Tour,** click here for a Summary of cognitive reading theory.]

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## Feedback

(Not shown in the diagram.) Under ideal conditions, learners receive feedback at various stages. A teacher, for example, may:

- focus learners' attention on important features of the new information, correct their first impressions, help them recall relevant knowledge, and build motivation.
- help learners elaborate the new knowledge so it becomes interconnected, memorable, and useful.
- identify and correct misconceptions or introduce helpful concepts and vocabulary.
- elicit strategies from students, or teach strategies helpful for different kinds of reading (e.g., scanning, reading headings, analyzing an argument).
- evaluate students' assimilated knowledge to see how accurate and complete and useable it is, then make assignments to correct deficiencies.

Because they are not interactive, the major media cannot provide direct feedback to ensure the accuracy of what readers learn. Later, we will consider whether media can offer alternatives to interactive feedback.

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# The Organization of Knowledge

## Networks and Schemas

### The Network Model

It is still a mystery how knowledge is stored, but cognitive researchers offer two main models for knowledge--the network model and the schema model.

In the network model, knowledge is stored in "a network of interrelated propositions." (See Figure 2.) Networks are simple "node-link" structures which can be related in complex ways. You might think of a network as a collection of contents ("propositions") which are interconnected in very specific ways that reveal important relationships among. A similar analysis of knowledge structure is widely used in research on artificial intelligence. Note 19 In the network model, connections, meaning, and learning are intertwined concepts: "When no meaning (no connections) can be created, nothing is learned." Note 20 We will return to the importance of connections when considering the implications of this model for writers.

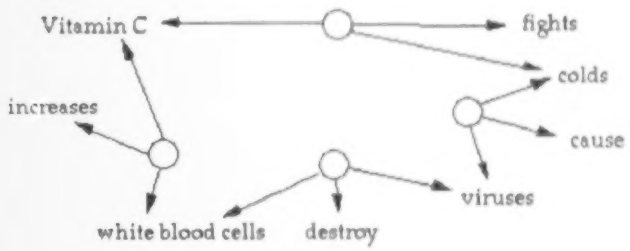



**Figure 2.** Memory represented as a propositional network composed of node-link structures. Not shown here are the many other links that radiate from each element to other elements in the memory network. The connections among nodes give information meaning and make it accessible. (Adapted from E. Gagne, 1985, p. 79)

### Schema Theory

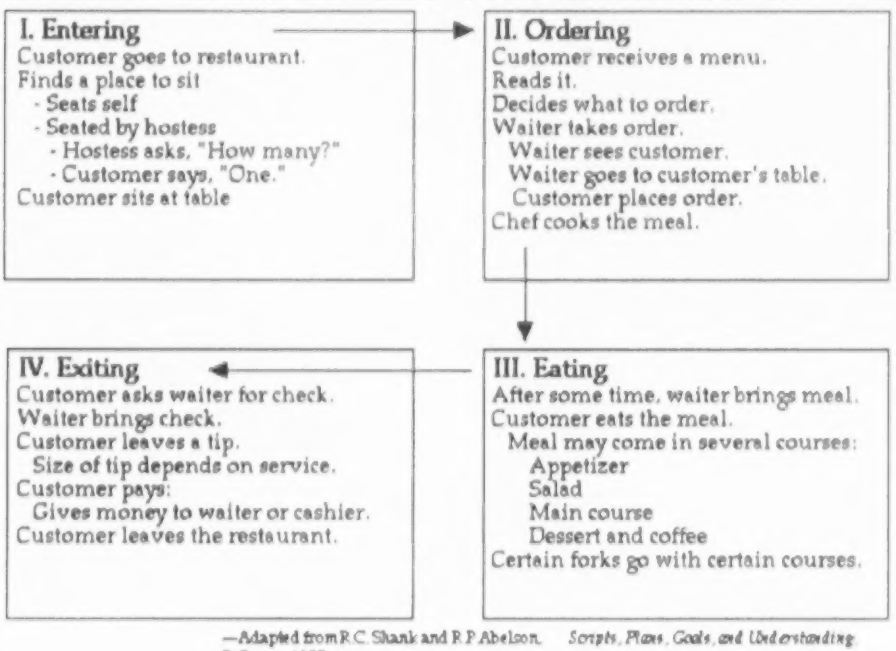
Schema theory provides a different view of how knowledge is stored, though network theory and schema theory are compatible and often used together. Network theory tends to present a somewhat mechanistic view of mind, modeled after the interconnections of computer memory. Schema theory presents a more creative, goal-oriented view of mental activity.

A schema is a generalized mental model which is used to organize memory, to focus attention, to interpret experience, and to codify actions. A schema is similar to a prototype or template, except that schemas are active, self-activating, self-revising processes. Note 21

As Anderson and Pearson explain it,

- Schemas are **abstract** (they contain summary information and prototypical categories, rather than details about a specific case) and they are
- **structured** (they represent relationships among component parts).
- Schemas are **dynamic**--they change, develop, interact.
- They arise **in response to situations** (e.g., the schema for starting your car comes to mind when you insert the key).
- They **shape perceptions** (in the dark it is easy to mistake a bush for a bear).
- They **provide context** and **vocabulary** for interpreting what we read. (A student moving from newswriting class to typography class shifts the interpretation of the word "lead" from "opening paragraph" to "spacing between lines of type.")
- They **organize experience** and **modify themselves** to accommodate new experiences.

Schemas are thought to express relationships among parts called "slots" (also known as nodes or variables). The schema for "going to a restaurant," for example, has a slot for "ordering an appetizer," and another for "paying the bill." (See Figure 3 .) The schema for "face" has as slot for "nose." The schema for "country" has slots for "location on the globe, size, type of government, geographical features," etc.




—Adapted from R.C. Shank and R.P. Abelson. *Scripts, Plans, Goals, and Understanding.* Erlbaum, 1977

**Figure 3. The Restaurant Schema.** According to schema theory, we understand the world in terms of prototypical patterns (scripts, schemas, narratives) in which are embedded a vast array of relationships, concepts, and vocabulary words.

When a schema is brought to mind and used to interpret some event, the schema's slots are then "instantiated" with the particular details of the moment. Into the schema of "face," you insert the particular details of a new face. The schema relieves you of the burden of counting the number of noses, eyes, ears, etc., on the face--you see the details of the new face on the template for "face."

"Placing" something by recognizing its role in a familiar schema ("instantiating" it) is a good deal like placing an incident in a familiar story. If someone read this passage aloud,

> "Now these three children had a faithful nurse called Nana; but Mr. Darling was angry with her and chained her up in the yard; and so all the children flew away,"

you would immediately understand every detail of it--if you had recently been reading about Peter Pan, who flew away with the Darling children while Nana, the dog who was their nurse, strained against her chain. Note 23

If you imagine how confusing this passage would be to someone not familiar with that story, you can understand how easily readers become confused when they are not familiar with the schemas underlying what has been written. Surely the practice of writing in a multicultural world requires us to gain a deeper appreciation of the schemas that writers do and do not share with various groups of readers.

Schemas play key roles in many cognitive processes. They help us pay attention, comprehend, interpret, remember, make inferences, set expectations, reason, solve problems, understand language structures, read, write, explain what we know, and have a sense of humor. Note 24

Schemas (and the overall worldview of which they are a part) tend to be self-maintaining. Indeed, some psychological theories treat schemas as the active means by which we continuously affirm our sense of self as well as our knowledge. No one is certain how schemas are acquired, but they do not always require the slow, repetitive reinforcement envisioned in older theories. Rather, people have the ability to pick up prototypical situations quickly, even with one exposure. It is also unclear how people keep from cluttering their minds with proliferating, conflicting, or superstitious schemas. (How do we weed our mental gardens and forget what is wrong or useless?)

People seem to have a built-in impulse to organize experience in the form of schemas. For the most part, schemas appear to be learned gradually; many are learned indirectly. Recent educational theory, however, has begun to consider the possibility of teaching schemas directly.

## The Effects of New Knowledge

The structures of the mind constantly receive new information and respond to it. New information can have several effects on a reader's existing knowledge structures. Three effects identified by Rumelhart and Norman include: Note 25

- **Accretion:** The new information may fit into a slot in an existing schema, and thus be quickly comprehended (e.g., the score for the second game of the World Series).

- **Restructuring:** A reader may use new information to create a new schema. (Eating certain things can help prevent cancer; oat bran is one of those.)

- **Tuning:** A reader may use new information to "tune" an existing schema so it is more accurate, complete, or useful. (Oat bran does not help prevent cancer after all, but other foods seem to.)

These activities are essentially the same as Piaget's categories of assimilation, accommodation, and equilibrium. New information can also have a few other effects on current knowledge, including two that are important for this paper:

- **Dissonance:** A reader may use new information to create and maintain cognitive dissonance. When new information does not fit with what is known, that information can be placed in long-term suspension as an anomaly--something apparently real but presently incomprehensible. The psycholinguistic explanation of reading (e.g., Frank Smith) implies that people activate their schemas to define what is "known" and then actively seek anomalies in order to test and update the known. It is like walking into a familiar room and sensing that some one object has been moved. Cognitive psychology's emphasis on the integrative power of the mind may have led us to neglect an innate human appetite for the spice of uncertainty. Within manageable proportions, everybody loves a mystery.

- **Confirmation:** As Boulding points out, a reader may also use new information to clarify or increase the degree of certainty of a schema (what Boulding calls an "image."). Note 26

One of the most interesting questions in current research asks under what conditions a schema is revised, supplemented, replaced, or abandoned. Such changes are near the heart of learning. When important schemas closely related to one's sense of self ("core schemas") are superceded or shattered, extreme confusion, suffering, and meaninglessness can result. Though sometimes as indurate as a deep-seated prejudice, core schemas may also be shattered by something as insubstantial as Desdemona's handkerchief. Knowledge, education, or even just learning to read, can be dangerous. Notes 27 - 28

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## Comprehension

Schema theory explains comprehension this way: "A reader comprehends a message when he is able to bring to mind a schema that gives a good account of the objects and events described in the message." Note 29

In some cases, this use of "schema" is what we commonly refer to as "context." For example, the statement "The notes were sour because the seam split" makes no sense until you are informed that it is a statement about a bagpipe (Anderson's example).

Classic research by Bransford and Johnson showed that it is possible to write paragraphs that are utterly incomprehensible until the reader receives an explanatory schema (such as a drawing or title) by which to interpret them--at which time they suddenly become quite clear. In other experiments, a simple title could induce readers to interpret an ambiguous passage as being about activities as different "playing cards" or "wrestling."

**A poor reader, a newcomer to a culture, or a reader ignorant of geography, government, etc., may lack the schemas that others fluently use to make meaning out of what they are reading. Or such**

**readers may apply an inappropriate schema--as children often do--and misunderstand.** Notes 30 - 31

To understand even simple words (charge, fast, strike, roll), you must first know which schema to instantiate them into (i.e., what content to interpret them in). For example, contrast the meaning of "check" in the schemas for

- "eating out,"
- "paying bills,"
- "making a list," and
- "playing chess."

Only the most abstract and technical terms, which are locked into single schemas (hilum, hispid, heterostylous), have single meanings. Words do not "have" multiple definitions; rather, the same word ("check") appears as the label for a different slot in several different schemas. The meanings are in the schemas (the contexts), not in the word. Vocabulary, then, comes from a knowledge of how the world works, not from what words mean.

As Frank Smith and others have emphasized, the overall meaning of a passage is not accreted by adding up the meanings of individual words; the meanings of the words themselves are determined by the larger context of meaning which the reader brings to the passage. Note 22

Indeed, due to the inherent ambiguity of individual words, constant interpretation is essential; Note 33 many words gain specific meaning only when placed in an appropriate schema. "Some comprehension of the whole is required before one can say how individual words should sound, or deduce their meaning in particular utterances, and even assert their grammatical function," Frank Smith wrote. "There is only one way in which print can be understood, and that is by having meaning brought to it." Notes 34 - 35

Any moment of meaning depends on a finely-balanced dance between the familiar patterns in the mind and the unique characteristics of the present moment. Schema theory proposes that, by automatically processing the vast bulk of familiar experiences, we can more fully attend to what is new and different. By making the familiar into background, schemas make the strange come forward. However, to someone without appropriate schemas, everything is strange.

All readers bring with them information that is not given in the text, and it is to a large degree the activation of this prior knowledge that makes reading possible. Note 32

Meaning is not assembled slowly from incoming chunks of verbal propositions (as earlier models suggest). Rather, onto the linear, analytic sequence of unfolding syntax, experienced readers quickly superimpose a holistic scenario of meaning, and then read selectively to adjust the fit. They guess the meaning of the passage, then correct their guesses as they proceed.

In this way, readers treat text not as information to be decoded but as evidence to be interpreted in solving another mystery of meaning.

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# The Strategic Reader

## Strategies of Readers

The "information transmission model" that underlies so many discussions of journalism describes readers as receiving and decoding information that arrives through a medium after begin encoded into a message by a sender. Information is moved around like canned goods, packaged by the sender, opened by the receiver. Writers and editors are accustomed to thinking that they way the write something determines its meaning. The new theory emphasizes how readers construct meaning. Notes 36 - 37

In the new view, readers are far more active and unpredictable. They make decisions about what to read, how to read it, how to think about what they read, what to remember, what other information to remember it with. They bring context, approach, bias, and personal experiences to what they read. They interpret, they skip, they misread, they misunderstand, they understand in their own way. Their reading is not reactive but strategic; they read with purpose, meaning, and goals. When the society column mentions that a prominent local family will be going abroad for the summer, that information is read very differently by their friends, by the owner of a lawn maintenance company, and by a burglar.

Readers are said to use two levels of strategies.

- **Cognitive strategies** enable the reader to understand written text.
- **Metacognitive strategies** govern the use of cognitive strategies--enabling one to manage the process of reading.

It is under the heading of "metacognition" that researchers discuss motivation, focusing attention, managing time, deciding what to read, along with methods for reading (such as reading the conclusion first, looking for key words and summaries, reading for main ideas, identifying the structure of text, self-questioning, and reading to remember ). Note 38

In practice, the two levels of strategy work together. Studies have demonstrated that better readers and learners go about the task more strategically than others do, which means they have greater conscious control over what and how they read.

Note that "literacy," in this view, is defined to include more than the ability to decode the alphabet and recognize vocabulary words. **Literacy** includes:

- usefully structured background knowledge,
- skill in handling the different ways text is commonly organized, and
- the ability to apply appropriate strategies to the task of reading.

In cognitive theory, there is nothing passive about reading, and the activity of reading goes far beyond the "decoding" step of the information-transmission model. Vaughn epitomized this view with his statement: "Reading is thinking stimulated by print." Readers engage nearly every kind of thought process during reading. Researchers describing reading have included: Notes 39 - 40

- categorizing

- previewing
- comparing and connecting and organizing ideas
- filling blanks in their knowledge structures
- evaluating evidence
- arguing with what they read
- passing and withholding judgment
- summarizing
- hypothesis testing and modification
- predicting
- clarifying, generating questions
- agreeing, disagreeing, anticipating
- learning new concepts
- deciding what is important
- skipping
- problem-solving
- making unexpected connections
- reflecting, reviewing, comparing
- analyzing, synthesizing
- looping back
- strategies for comprehending words, sentences, segments of text, conventions of writing and organization.

The strategic activities of readers are not only highly active and interpretive, they are **recursive** and **non-linear**. Although there are surely times when readers start with the first word of a piece and read through sequentially, researchers have emphasized the extent to which readers (especially of non-fiction) **scan, select, skip, pause, loop back**, and do a considerable amount of rooting around the page. Indeed, readers not only adopt strategies toward what they read ("I'll just skim this."), they test and modify those strategies as they go ("Oops, this is too important to skim.")

Readers make ready use of **nonverbal cues** with they read. They interpret

- pictures,
- graphics,
- color,
- charts,
- symbols,
- decorations,
- cartoons,
- typography,
- rules (lines and boxes),
- spatial relationships (such as indentation and over/under),
- recurring positions and patterns, and
- other spatial cues.

Paivio Note 41 and many others have argued that readers carry on different modes of thinking simultaneously ("multitasking," to use the current computer term), at least including visual and linguistic modes of thought. A person's knowledge structure--though described by many researchers in terms of linguistic propositions--is sure to contain spatial modes of organization.

What looks from one perspective like words on a page becomes (when it enters the life of a reader) an integral part of a rich, multimodal, imaginatively elaborated inner world. And because every reader translates the written message into such a world, we can never know information as information alone, but only as as it is reflected in a particular, lived system of meaning.

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## Summary of cognitive reading theory

In cognitive theory, then, readers are selective, active, and strategic. They understand what they read in terms of what they already know -- though what they read may modify what they know.

Readers activate strategies for managing their approach to a text, along with schemas for interpreting it. Readers may modify the strategy of reading and shift the context of interpretation as they go.

New information becomes meaningful only as it is interconnected with ("elaborated" with or "instantiated" into) meaningful patterns that the reader already knows.

When new information is interconnected with the old in meaningful patterns, it becomes knowledge--and it can then be recalled, reasoned with, extended by inference, and used to filter new perceptions.

Readers do not "receive" information. They approach reading in the context of the entire world of their experience, and they turn away with that world confirmed, modified, extended, or challenged.

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If you are on the **short tour**, go to Table 1.

# The Role of Text in Comprehension

## Text Patterns

Like other constructivist theories, cognitive reading theory at times sounds solipsistic. Reading almost appears to take place entirely in the minds of isolated readers who invent meaning in independent and unrelated ways.

But though reading is a highly individual act, it takes place in the context of a social group Note 42 and in relation to a text. The organization of that text can play a crucial role in reading.

Not only is the organization of the written text important, cognitive researchers studying reading and writing maintain that nearly all prose comes in a small number of recurring organizational patterns. The several systems for naming these patterns agree on many of the "generic" patterns commonly found in writing, though experts emphasize that there are other specialized forms of prose (e.g., the news report, the technical article on medical research, the grant proposal, the resumé). Jones (who has published several useful studies on this topic) describes three generic types of organization which occur widely in writing of all kinds: Note 43

1. Texts containing **one major element**, plus supporting information, such as:

- passages describing a single object
- paragraphs that state a proposition and offer support for it
- simple arguments (a conclusion supported by reasons)
- definitions of concepts (what is it? what are its attributes?)

2. Texts describing **a sequence**, such as:

- chronological narratives
- step by step logical accounts
- step by step descriptions of a procedure or stages in a development
- other sequential narratives, such as a goal/ action/ outcome report

3. Texts comparing **two or more elements**, such as:

- comparison and contrast
- problem/solution
- cause/effect
- analysis of interactions (cooperation and conflict)

Each type of text organization embodies a different kind of thought process and reveals that thought process through the use of **"signal" words**.

Good readers not only interpret the literal meaning of words and sentences, they also identify the structure of the text and activate thought processes that help them interpret the thought. Note 44

For example, terms like "in contrast, like, similar, resemble, share, have in common" signal a

comparison/contrast thought and text structure and encourage the reader to summon appropriate strategies for interpreting that thought.

In order to comprehend a comparison, the reader must construct an idea of each of the things being compared, distinguishing them by the points of comparison. Reading a comparison as two unrelated descriptions or as a continuous narrative would miss the point.

Different text structures have different signal words. A story that opens "Once upon a time" cues the reader to expect an entirely different kind of text structure and invites a different reading strategy. Again, Smith captures the point clearly: "To be able to read a text, we must be able to anticipate the conventions that the writer will employ." Notes 45 - 46

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## Frames -- another method for organizing information

A frame is a specialized form of schematic organization used in writing. A frame is "a representation intended to guide the process of thought, supporting, organizing, and catalyzing that process." Note 47

The information the clerk writes on the back of your check is a simple kind of frame--containing a few established identifiers such as driver's license number, race, sex, age, work phone, etc. In their most common usage, frames encode, in easily understood form, the essential categories by which we understand certain kinds of events.

Researchers attempting to improve textbooks were among the first to study frames as a method of organizing information. They concluded that consistent, careful use of frames helped students learn the categories and concepts of the subject matter.

For example, a "region" frame is used in many geography texts; whenever a new region is covered, a text box provides basic information on it (climate, size, ecological habitats, topography, etc.). A text which uses the same frame for each region is likely to be more effective than one which gives different categories of information for each region.

Texts covering more complex topics (Armbruster gives the example of ecological habitats) become easier to understand when each similar topic is "framed" in a similar way. As obvious as this sounds, it is a discovery that only began to shape textbooks in recent years, and a similar awareness is just beginning to enter other kinds of writing.

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## Considerate Text

Good readers will interpret text in terms of some kind of organizational pattern; if the text lacks a clear pattern, good readers will impose one.

Effective texts signal their own content, context, structure, and strategy so that readers can know how to approach them. Writing that does not signal its structure is more difficult than writing that does,

especially for poor readers.

"Considerate text"--text that is:

- well-written,
- well-organized, and
- signals the organization of its thought to the reader

--is easier for both good and poor readers to understand. Indeed, "considerate text" (the phrase was coined by Anderson and Armbruster ) Note 48 seems to improve the ability of poor readers to understand and remember what they read.

Table 1, "How to Serve the Strategic Reader," proposes a list of ways a writer can produce "considerate text."

I derived Table 1 by abstracting major themes from the research literature, identifying their practical implications, and converting those into a "how to" format. It is offered as exploratory--but well-grounded--advice.

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Table 1
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# Implications

## Journalism

Many of the suggestions in Table 1 are already being used in publications like USA Today, recently redesigned newspapers in the Gannett and Knight-Ridder chains, textbooks, popular nonfiction books like Megatrends, magazines, and many newsletters. They are part of the new style of shorter articles and colorful graphics that mark many publications in the age of television.

What appears in such publications to be a "style" of writing and layout may be a reflection of something far deeper -- an understanding of the strategic reader. When analyzed in the terms of this study, many articles and layouts seem to have been designed with a surprising degree of cognitive reading theory in mind.

It seems unlikely, however, that cognitive theory is the driving force behind the redesign of newspapers. Note 49 It is more likely that the focus groups and reader surveys used in the redesign of newspapers have led to practices similar to those derived here from cognitive theory (see, for example, the redesigns described in the Knight-Ridder 25/43 Project). Note 50 Indeed, current innovative practices in newspaper writing and design may be ungrounded in any kind of theory; they are probably products of the practitioner's art.

When asked to explain the wave of redesign sweeping across journalistic publications, editors often use terms from stimulus-response, association, and information theories. Yet the creative innovations of recent redesigns have caused these journalists to leap into a style of writing and layout that can be understood only in terms of cognitive theory.

As is so often the case with professionals, practitioners of journalism can do far more than they can explain. Practice has outrun theory. Journalists and journalism educators need a theory that not only explains what journalists are already doing, but provides concepts that can be used to improve both journalistic practice and professional education. Note 51 This paper is offered as one contribution toward that goal.

## The Teaching of Writing

See Table 1, "Serving the Strategic Reader," for a suggestions on how to apply the concepts of this article to writing and the teaching of writing.

Table 1. How to Serve the Strategic Reader
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Contents

**Table 1.**

# How to Serve the Strategic Reader

## Signal the organization of your text

1. Write an article that makes its structure clear, signals that structure consistently, and encourages readers to learn a strategy for processing articles structured in such a manner.

What is signaled: type of article, section-by-section organization, organization of sentences and paragraphs.

## Signal the learning-purpose of your article

2. Signal how you think this article relates to what readers already know. Indicate what you think will be the relation between this article and the reader's existing schemas, to further prepare reader to construct meaning from the article:

> **Accretion** (assimilation) -- adds new content to a pattern the reader already knows. Asks the reader to recall a known pattern and learn a new instance of it.
>
> **Tuning** (accommodation)--changes the way reader knows something. Asks reader to recall a pattern and modify it.
>
> **Restructuring**--adds a new way of knowing. Asks reader to learn, remember, and use a new way of organizing knowledge.
>
> **Dissonance**--challeges reader's view. Asks reader to recall a familiar pattern and accept an inexplicable instance that does not fit that pattern.
>
> **Confirmation**--confirms reader's knowledge. Asks reader to recall a pattern and recognize that it has been validated. Sometimes the pattern undergoes an apparent challenge before finally being confirmed. (Entertainment is based on confirmation.)
>
> (There may be others.)

## Write for the strategic reader

3. Clearly identify what audience this article is for. Layout, headlines, subheads, pull quotes, and graphics should accomplish this. Your immediate signals (title, subtitle, opening, tone) should enable readers to decide whether to skip this article, skim it, or settle down to read it with care.

4. Assume and encourage a strategic reader who chooses what, when, and how to read, reads

interpretively, and interprets the article as an organized whole. Honor thy reader.

5. Write not only for those who read in a continuous manner, but also for those who scan, sample, and read in a recursive and non-linear manner. For example, first references to all names that appear later in the article might be put in bold, so strategic readers who begin in the middle of the article can quickly understand who is being quoted.

6. Write to be decoded by standard cognitive strategies familiar to readers. Note that this advice reverses the usual approach-- to "write clearly and simply" -- by shifting attention from the writing to the reading. What is "clear and simple" depends on who the audience is.

7. Model and facilitate cognitive strategies such as categorizing, connecting ideas, evaluating evidence, clarifying, problem-solving, reflecting, analyzing, synthesizing.

8. Reward the reader who uses metacognitive strategies, by helping that reader decide what to read, find key words or summaries and identify the structure and context of the article before reading it. One of the major roles of layout is to facilitate such metacognitive processing.

9. Model and encourage thinking. (Critical, analytical, creative, interpersonal, spatial, etc.)

10. Use advance organizers (e.g., summaries or opening questions) and other devices to focus attention, give an overview, and define context (including graphic devices).

11. Address misunderstandings that might arise from readers interpreting your article in an inappropriate context. (Establish context, clarify confusable terms, places, names, or events.)

12. Make your subject clear. Announce the article's categories of concern, using headlines, subheads, sidebars, boxes, frames, infographics, or other devices.

13. Without doing all of it for them, assist readers in abstracting the gist of the article. Help them distinguish levels of importance (or levels of detail), distinguish important from less-important information, and locate information that is relevant to their perspectives.

14. Anticipate misunderstandings that might arise from readers interpreting the article in an inappropriate context (perhaps by clarifying confusable terms, places, names, or events).

15. Help readers distinguish between information which should merely be noted and information which deserves to be thought through, digested, and remembered.

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## Activate the reader

16. Set the stage and prime your reader. Establish the context for the information in the article and encourage readers to activate their schemas which provide background knowledge, relevant vocabulary, and strategies of interpretation. Graphics and layout are major tools for activating schemas--including such devices as subheads, pull-quotes, and context-setting sidebars.

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## Make connections

17. Help readers connect and elaborate. Through such devices as transitions and paragraph labels, clearly indicate how different parts of the writing connect with one another. Also give the reader ways to increase the connections between the new and the known, so the new becomes integrated into the reader's knowledge structure.

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## Create cognitive motivation

18. Create a gap and fill it. Help readers identify a gap (between what they know and what they want to know, or between the way they imagine something and how it actually is) and create a spark of motivation to fill that gap.

19. Make the information meaningful (instead of just presenting information). Information becomes meaningful when it is richly interconnected with what the reader previously knew, and when the reader can access it as needed.

---

## Promote synthesis, meaning, values, and culture

20. **Post-processing**--Try to make up for the lack of interaction with readers by simulating feedback, interaction, and post-processing. Post-processing includes such activities as discussion, summarization, self-testing, thinking things over, reacting, reaching a different conclusion, and making a synthesis.

21. **Digests**--Provide regular summaries, digests, or commentaries to which the readers can compare their evolving syntheses.

22. **Interactive synthesis**--Write in a manner that invites interaction. For example, make your biases clear so readers can compensate for them or argue with them.

23. **Meaning**--Regularly write articles that attempt to come to terms with recent news and create meaning from it. Mirror and support readers' efforts to make meaning in their own lives.

24. **Models**--Regularly feature individuals and groups who are themselves active, strategic interpreters and creators of our shared world (in contrast to focusing primarily on victims).

25. **Values**--Identify and promote essential values. Identify value conflicts, maintain and renew a vocabulary for discussing values, and where appropriate, present information in relation to values.

26. **Shared Schemas**--Encourage a common interpretive pool of shared schemas by the way each article creates, activates, services, modifies, and refers to the shared interpretive schemas of the readership. In this way, cultivate a citizenry and a core of common culture.

Contents

# Summary

Through a review of recent explanations of reading, this study described a shift in the understanding of how people read. The shift has been from the passive reader who receives and decodes information to the strategic reader who actively chooses what, when, and how to read, reads interpretively, and interprets the article as an organized structure. From that review, this study derived a number of methods publications can use to serve the strategic reader, listed in Table 1.

The methods of serving the strategic reader proposed in this study suggest a vocabulary for beginning to name and understand some things that are already going on in journalism, so we can find new ways to improve its practice and training.

The activities of reading, interpreting, making models, placing events into contexts, grouping experiences into schemas, and otherwise making meaning are not just things readers and writers do. These activities help create and maintain meaning in a world where rapidly changing facts have replaced global certainties. All forms of writing can be part of that meaning-making process.

Contents
Annotated Bibliography

Heal.html1. Frank Smith, Reading (2nd ed.), Cambridge University Press, 1985. Back

2. See Frank Smith's essay against "information" in Essays Into Literacy, London: Heinemann, 1983, Chapter 13; and the deconstruction of the idea of information in John D. Peters, "Information: Notes Toward a Critical History," Journal of Communication Inquiry, 12, (2), 1989, pp. 9-23. A moratorium on the word "information" would force all of us to rethink what we mean. Back

3. For the view that no paradigm shift has yet taken place, see Michael L. Kamil, "Current Traditions of Reading Research," in P. D. Pearson (Ed.), Handbook of Reading Research, New York, Longman, 1984, pp. 39-62. Back

4. George H. Mead, The individual and the social self (Ed. David L. Miller). University of Chicago Press, 1982.

5. J. Piaget, Six Psychological Studies. (New York, Random House, 1967.)

6. Lev S. Vygotsky, Thought and Language, Ed. and trans. Eugenia Hanfmann and Gertrude Vakar (Cambridge, Mass.: The M.I.T. Press, 1962; Originally published in Russian in 1934).

7. F. C. Bartlett, Remembering, London, Cambridge University Press, 1932.

8. Susanne Langer, Philosophy in a New Key. Harvard, 1951.

9. Ernst Cassirer, Essay on Man: An Introduction to a Philosophy of Human Culture. Garden City, NY: Doubleday, 1944.

10. Those familiar with some of the literature will recognize in this paper a "top-down" or "inside-out" model of reading that emphasizes the reader's activity, in contrast to the "bottom-up" or "outside-in" model which emphasizes the words on the page. Back

11. The terminology is unsettled. "Psycholinguistic," which may be a better term, does not seem to be taking the world by storm, and many who practice "cognitive" research imply the information-transmission model of communication, overly use computer models of mind, and neglect the existential, emotional, bodily, and social frameworks that support and shape cognition.

12. Sharon J. Derry, "Learning Strategies for Acquiring Useful Knowledge. In Dimensions of thinking and cognitive instruction, ed. Beau Jones & Lorna Idol (Hillsdale, NJ: Erlbaum, 1990), p. 347 - 379. Back

13. Frank Smith, Understanding Reading: A Psycholinguistic Analysis of Reading and Learning to Read (4th ed.). Hillsdale, NJ: Erlbaum, 1988, p. 22. Back

14. Frank Smith, Understanding Literacy, p. 53. How do readers of journalistic publications learn to ask appropriate questions and find relevant answers in what journalists write? Back

15. Derry, op. cit., p. 352. Back

16. See, for example, Kathleen T. McWhorter, Efficient and Flexible Reading (3rd ed.). New York: Harper Collins, 1992. Back

17. Jean Matter Mandler, Stories, scripts, and scenes: Aspects of schema theory. Hillsdale, NJ: Erlbaum, 1984.

18. The Image: Knowledge in Life and Society. Ann Arbor: University of Michigan, 1963. Back

19. E.g., Neural Networks and Natural Intelligence, Ed. Stephen Grossberg, Cambridge, Mass.: MIT Press, 1988. This brief summary omits the distinction between "declarative" knowledge (information) and "procedural" knowledge (how to do something) that is important to the network model. See Ellen D. Gagné, The Cognitive Psychology of School Learning (Boston: Little, Brown, 1985) or Derry, op. cit.

20. E. Gagné, op. cit., p. 79. Back

21. For relevant introductions to schema theory, see Richard C. Anderson, "Role of the Reader's Schema in Comprehension, Learning, and Memory," in Richard C. Anderson et al. eds., Learning to Read in American Schools (Hillsdale, NJ: Erlbaum, 1984). Also R. C. Anderson and P. D. Pearson's "A Schema-Theroetic View of basic Processes in Reading Comprehension," in P. D. Pearson (Ed.), Handbook of Reading Research, New York, Longman, 1984, pp. 255-291 Back

22. Understanding Reading, p. 28ff. Smith also summarizes the importance of narrative in the way we organize experience (p. 226ff), also a theme in Jean Mandler's Stories, scripts, and scenes: Aspects of schema theory. Hillsdale, NJ: Erlbaum, 1984. Back

23. James M. Barrie, Peter Pan, New York: Grossett and Dunlap, 1965 (first pub. 1911). At the moment quoted, Wendy is telling her own story to the Lost Boys, in chapter 11. Back

24. Many jokes depend on knowledge of underlying schemas. Here is one I adapted from a lawyer joke: "Near the end of the Gulf War, a planeload of journalists was hijacked by Iraqi terrorists. The terrorists threatened that, if their demands were not met, they would release one journalist every hour." The joke depends on your knowledge of the usual schema for a hijacking and of an unrelated schema which maps a common antagonism between journalists and authorities. The joke gains its humor by unexpectedly switching the definition of the authorities' role from the first schema to the second. Back

25. David E. Rumelhart and Donald A. Norman, "Accretion, Tuning, and Restructuring: Three modes of Learning," in J. W. Cotton & R. L. Klatzky (Eds.), Semantic Factors in Cognition. Hillsdale, NJ: Erlbaum, 1978) pp. 37-54. Back

26. The Image, p. 10. Back

27. See Nancy Cantor, "From Thought to Behavior: 'Having' and 'Doing' in the Study of Personality and Cognition," American Psychologist, 1990, 45 (6), pp. 735-750.

28. No account of reading can ignore poignant stories of how the acquisition of literacy has cost some people their native culture and identity. See, for example, Richard Rodriguez, The hunger of memory: The education of Richard Rodriguez. Boston: Godine, 1981. Back

29. R. C. Anderson, "Role of the Reader's Schema," p. 243. Back

30. J. D. Bransford and M. K. Johnson, "Contextual Prerequisites for Understanding: Some Investigations of Comprehension and Recall," Journal of Verbal Learning and Verbal Behavior, 1972, 61, 717-726.

717-726.

31. For about a year, whenever I read him The Flopsy Bunnies, my son heard the phrase "Mr. McGregor's rubbish heap" as "Mr. McGregor's rubber sheep." By the time we discovered this mis-hearing, he had developed some interesting thoughts about the "rubber sheep" in this Peter Rabbit story. Imagine the perplexity of the cartoon dog who thought his master was saying, "Heal!" Back

32. R. C. Anderson and P. D. Pearson, "A Schema-Theroetic View of Basic Processes in Reading Comprehension," in P. D. Pearson (Ed.), Handbook of Reading Research, New York, Longman, 1984, p. 272. Back

33. This is a basic theme of schema theory--e.g., J. Bransford, "Schema Activation--Schema Acquisition," in R.C. Anderson, J. Osborn, & R.C. Tierney (Eds.), Learning to Readin American Schools. Erlbaum, 1983. Back

34. Reading, p. 72.

35. Understanding Reading, p. 30. While I was trying out this idea on a faculty group, one man interrupted by gleefully spelling, "C-A-T" and demanding that I explain what schema was necessary to understand such a simple, unambiguous word.

Peter Pan came to my rescue: To terrorize the captured Lost Boys, Captain Hook threatens, "Do you want a touch of the cat before you walk the plank?" The boys fall to their knees and beg to be spared, but Hook grimly orders, "Fetch the cat, Jukes."

I wonder how many wide-eyed children have visualized Jukes emerging from the cabin carrying, not the cat-o'-nine-tails whip, but some imaginary and terrifying feline. Back

36. The information-transmission model is vividly critiqued by James W. Carey in Communication as Culture: Essays on Media and Society, Boston: Unwin Hyman, 1989.

37. See Frank Smith, Understanding Reading: A Psycholinguistic Analysis of Reading and Learning to Read (4th ed.). Hillsdale, NJ: Erlbaum, 1988. Also Reading, Cambridge University Press, 1985, and Essays Into Literacy, London: Heinemann, 1988). Back

38. For a good summary, see"Metacognitive Skills and Reading" by Linda Baker and Ann L. Brown, in P. D. Pearson (Ed.), Handbook of Reading Research, New York, Longman, 1984, pp. 353-394. Back

39. Joseph L. Vaughn, "Concept Structuring: The Technique and Empirical Evidence," in Charles D. Holly and Donald F. Dansereau, eds., Spatial Learning Strategies: Techniques, Aplications, and Related Issues (Orlando, Fla.: Academic Press, 1984) p. 127.

40. Jones et al., 1987 Back

41. Allan Paivio, Mental Representations: A Dual Coding Theory (Oxford: Clarendon, 1986). Back

42. The social aspect of communication is an important area not considered in this paper. For a clearly-written account, see Leeds-Hurwitz (1989). For a more postmodern view, see various works of M. Foucault, such as The Order of Things: An Archaeology of the Human Sciences. New York: Random Hosue, 1970. Back

43. Jones et al., 1987, pp. 33-34. For a more involved discussion that includes discourse analysis and story grammar, see "The Structure of Text," by Bonnie J. F. Meyer and G. Elizabeth Rice, in P. D. Pearson (Ed.), Handbook of Reading Research, New York, Longman, 1984, pp. 319-352. Back

44. The idea is widespread but not widely applied. See, for example, William J. Vande Kopple, "Some exploratory discourse on metadiscourse" College Communication and Composition, 1985, 36: 82-93. Many writers leave out transitional words and phrases, because they believe "good writers" don't need them. In doing do, they fail to realize that readers need those transitional terms to activate the cognitive processes of comprehension. Notice also how the traditional inverted pyramid news report requires that such connective structure-signals be omitted, presumably to make shortening easier. You can't cut a paragraph that begins, "On the other hand" or "Finally." Back

45. Jones, et al., p. 25. Recent work by Jones and others on semantic organizers raises the possibility that certain kinds of diagrams may be closer to the mind's way of storing knowledge than are paragraphs and sentences. What we know as reason may be not so much a reflection of the nature of mind or the nature of reality as it is the kind of analysis required before you can write in linear, fully-elaborated, fully-connected prose. See John H. Clarke, Patterns ofTthinking : Integrating Learning Skills in Content Teaching. Boston : Allyn and Bacon, 1990.

46. Smith, Understanding Reading, p. 46. Back

47. David N. Perkins, "Thinking Frames," Educational Leadership, May 1986, p. 7. The concept of frames is usually credited to Marvin Minsky in "A Framework for Representing Knowledge," in P.H. Winston (Ed.), The Psychology of Computer Vision. New York: McGraw-Hill, 1975. Back

48. Richard C. Anderson and B.B. Armbruster, "Studying," In P.D. Pearson, ed., Handbook of Reading Research (New York: Longman, 1985) pp. 657-680. Back

49. In presentations I attended in the fall of 1991 at Florida A&M University, participants in the Knight-Ridder and Gannett redesign projects spoke often of their own focus groups and reader surveys but indicated that cognitive research did not play a major role in the redesign of their newspapers. Indeed, the language I have heard used by industry innovators is sprinkled with terms from information and stimulus-response theories and notably lacking in terms from cognitive theory. For example, Knight-Ridder editors have described certain topics as "hitting the baby boomer's hot buttons." One morning those boomers, who as strategic readers want to be treated with respect, may tire of being manipulated by contrived content and intrusive layout. Back

50. Knight-Ridder 25/43 Project: The Transformation of an American Newspaper (Author, 1989).

51. C. Argyris & D. A. Schoen, Theory In Practice: Increasing Professional Effectiveness (San Francisco: Jossey-Bass, 1976). Back

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